

# TECHNICAL SERVICE INFORMATION for



**OLDSCHOOL-SOUND**

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## CAUTION

These servicing instructions are for use by qualified personnel only. To avoid risk of electric shock, do not perform any servicing other than that described in the Owner's Manual unless you are qualified to do so. Refer all servicing to qualified service personnel.

MOOG MUSIC INC.

2500 Walden Avenue, Buffalo, New York 14225

716-681-7200

MOOG MUSIC

p/a Waathaven Zuid Zijde 48, 3088 HJ, Rotterdam, The Netherlands

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## SPECIFICATIONS

### KEYBOARD

Description: 37 Note C to C, Low note priority  
Keyboard Transpose: +1 Octave (Left hand control)  
Glide Time: Linear, continuously variable from less than 2 msec to 5 sec (bottom to top of keyboard)

### MODULATION

Rate: Continuously variable from 0.25Hz to 325Hz  
Amount (Square wave): Oscillator, zero to 16 semitones  
Filter, zero to 5 octaves

### OSC 1 AND OSC 2

Reference frequency: Low C 32', 32.7Hz +/- 0.1Hz  
Scale factor accuracy: 0.21% from 65Hz to 1.5kHz  
Range drift due to temp: 0.01% to 40°C less than 0.02%/°C  
Pulse duty cycle: Continuously variable from 5% to 95%  
Octave accuracy: 0.2%  
Output level range: 80dB  
Interval range: 2.1 Octaves  
Interval change: +/- 3%

### VCF

Type: Low pass 24dB/octave cutoff slope with variable height resonant peak at cutoff frequency.  
Range of cutoff: 30Hz to 25kHz  
Keyboard tracking accuracy: Full mode, .05% (30Hz to 20kHz)  
Sweep of cutoff frequency by contour generator: 10 octaves

### CONTOUR GENERATORS

Type: Microprocessor controlled ADSR, retriggerable  
Range of attack, decay, release times: 1 msec to 10 sec.  
Range of sustain level: 0 to 100% of peak contour

### VCA

Audio output level: 0dBm  
Dynamic range: 80dB  
Output offset: Less than 100mV

### REAR PANEL I/O

Final tune: +/- 3 semitones  
KB CV IN/OUT: 1V/octava +/- 2%  
Input impedance = 50K ohm  
Output impedance = 1K ohm  
3-Trigger in: Switch closure to ground triggers contour generator, Input impedance greater than 1K ohm  
S-Trigger out: Trigger on 1st switch closure to ground  
Cassette I/O: Tape interface with transport on/off control  
Audio Output: 0dBm, Output impedance = 600 ohm

### POWER REQUIREMENTS

Operating voltage range  
Domestic: 95 to 130 VAC 60Hz  
Export: 200 to 260 VAC 50Hz

Power consumption: Less than 30 watts

### DIMENSIONS AND WEIGHT

Overall size: 26-3/8" wide, 12-1/2" deep, 3" high  
(67cm x 31.75cm x 7.62cm)

Net weight: 22 lbs. (9.85kg)

### WARNING

Hazardous voltages are present in power supply circuit. Disconnect AC supply cord prior to disassembly. Exercise care when making tuning adjustments with unit operating to avoid contact with exposed wiring near primary switch and fuse holder.

Carefully t  
board mounting  
Lower base, tem  
left side. Use a s  
up housing to ga

Incremental  
screws located n  
remove knob fo

Power Sup  
screws at front a  
plate at rear, wh  
housing. Power  
removed withou

Digital and  
by plastic clips.  
clips to avoid br  
required.

### CAUTION

Digital Memory circuits are powered by a 3V lithium battery, BT-1. DO NOT short circuit, overload or attempt to charge this cell. Explosion and release of corrosive chemicals may result.

### DISASSEMBLY PROCEDURE

#### NOTE

Before proceeding with disassembly, take care to protect finished wood and lacquered metal parts from sharp objects. Use carpeted or similarly protected surface.

To gain access to tuning adjustments, bottom assembly including keyboard must be separated from upper housing. Start by removing (2) screws from lower rear panel located on either side of Moog logo.

Place unit upside down and remove (4) screws holding bottom to wood ends. Remove rear keyboard mounting screws near center of bottom and loosen (3) front keyboard machine screws until they are finger tight.

Place unit on its feet, lift rear edge approximately one inch and tilt forward to release housing from front groove.

Slide housing forward to clear keys. Lift and rotate front of housing up and rest on rear panel. Take care not to stress flexible "tails" on membrane switch which connect this panel to a P.C. Board at rear of unit.

Part	Description
111	Header, 2 Pin
112	Header, 3 Pin
113	Header, 18 Pin
114	Header, 18 Pin
115	Header, 18 Pin
116	Header, 18 Pin
117	Header, 18 Pin
U1	IC, Voltage
U2	IC, Voltage
U3	IC, Voltage
U4	IC, Voltage
Q1	Transistor, PNP
Q2	Transistor, PNP
Q3	Transistor, PNP
Q4	Transistor, NPN
CR1	Diode, Rect
CR2	Diode, Rect
CR3	Diode, Rect
CR4	Diode, Rect
CR5	Diode, Rect
CR6	Diode, Rect
CR7	Diode, Rect
CR8	Diode, Rect
CR9	Diode, Rect
CR10	Diode, Rect
CR11	Diode, Rect
CR12	Diode, Rect
CR13	Diode, Rect
C1	Capacitor, 1uF
C2	Capacitor, 1uF
C3	Capacitor, 1uF
C4	Capacitor, 0.01uF
C5	Capacitor, 0.01uF
C6	Capacitor, 0.01uF
C7	Capacitor, 0.01uF
C8	Capacitor, 0.01uF
C9	Capacitor, 0.01uF
C10	Capacitor, 0.01uF
C11	Capacitor, 0.01uF
C12	Capacitor, 0.01uF
C13	Capacitor, 0.01uF
R1	Resistor, Tr
R12	Resistor, Tr
R13	Resistor, Tr
R14	Resistor, Tr

Carefully rotate base up to gain access to keyboard mounting screws and remove (3) front screws. Lower base, remove keyboard assembly and set to left side. Use a screwdriver or similar tool to prop up housing to gain access to trim adjustments.

Incremental control assembly is retained by (2) screws located under knob. Loosen set screw and remove knob for access.

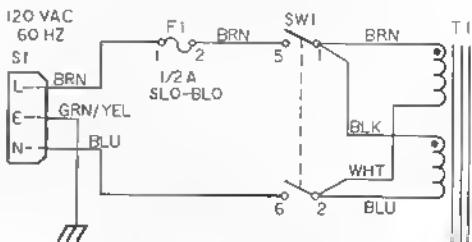
Power Supply P.C. board is retained by (2) screws at front and an aluminum heat sink coupler plate at rear, which in turn is bolted to rear of housing. Power transistors are socketed and can be removed with hour removal of P.C. board.

Digital and Synth Board assemblies are retained by plastic clips. Care should be taken when bending clips to avoid breakage should board removal be required.

#### NOTES:

- 1. UNLESS OTHERWISE SPECIFIED –  
ALL RESISTORS ARE IN OHMS, 1/4W,  $\pm 5\%$ .  
ALL CAPACITORS ARE IN MFD (MF).  
ALL DIODES ARE IN4004.

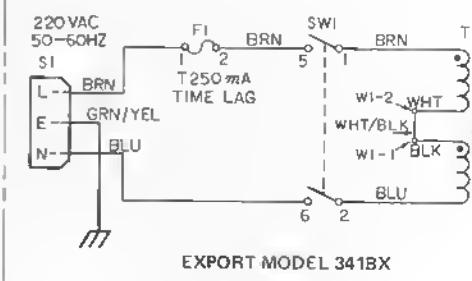
\* 2. F2, F3 & F4 USED ON EXPORT 220VAC ONLY.



DOMESTIC MODEL 341A

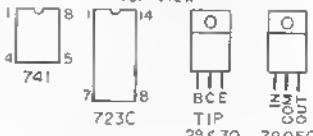
#### POWER SUPPLY PRINTED CIRCUIT BOARD I

REF DESIGN	DESCRIPTION	PART NO.
P11	Header, 3 Pin, 1.56 Cr. Locking	910-042531-003
P12	Header, 3 Pin, 1.56 Cr. Locking	910-042531-003
P13	Header, 10 Pin, 1.00 Cr.	910-042209-010
P14	Header, 10 Pin, 1.00 Cr.	910-042208-010
P15	Header, 10 Pin, 1.00 Cr.	910-042208-009
P16	Header, 10 Pin, 1.00 Cr.	910-042208-009
P17	IC, Voltage Reg., 223C	911-041119-002
U1	IC, Operational Amplifier, 141	911-041119-001
U2	IC, Voltage Reg., +5V, 1A, 7805C	911-045309-001
U3	IC, Voltage Reg., +5V, 1A, 7805C	911-045309-001
U4	Transistor, NPN Power, Tip 29	991-041649-001
Q1	Transistor, PNP Power, Tip 30	991-041650-001
Q2	Transistor, PNP, 2N3905	991-041652-002
Q3	Transistor, PNP, 2N3905	991-041652-002
Q4	Diode, Rectifier, 1N4004	919-041620-002
CR1	Diode, Rectifier, 1N4004	919-041620-002
CR2	Diode, Rectifier, 1N4004	919-041620-002
CR3	Diode, Rectifier, 1N4004	919-041620-002
CR4	Diode, Rectifier, 1N4004	919-041620-002
CR5	Diode, Zener, 1N4708A	919-041755-002
CR6	Diode, Rectifier, MRS502	919-041151-007
CR7	Diode, Rectifier, MRS502	919-041157-001
CR8	Diode, Rectifier, MRS502	919-041157-001
CR9	Diode, Rectifier, MRS502	919-041511-001
CR10	Diode, Rectifier, 1N4004	919-041620-001
CR11	Diode, Rectifier, 1N4004	919-041620-001
CR12	Diode, Rectifier, 1N4004	919-041620-001
CR13	Diode, Rectifier, 1N4004	919-041620-001
C1	Capacitor, Tubular, 0.01uF	941-045011-103
C2	Capacitor, Tubular, 0.01uF	941-045011-103
C3	Capacitor, Electrolytic, 1000uF/1.25V	946-040225-011
C4	Capacitor, Electrolytic, 1000uF/1.25V	946-040225-011
C5	Capacitor, Tantalum, 1 uF/25V	946-040221-002
C6	Capacitor, Tantalum, 1 uF/25V	946-040221-002
C7	Capacitor, Polyester, 0.015 uF	946-041978-152
C8	Capacitor, Polyester, 0.015 uF	946-041978-152
C9	Capacitor, Tantalum, 1 uF/25V	946-040221-009
C10	Capacitor, Tantalum, 1 uF/25V	946-040221-009
C11	Capacitor, Tantalum, 1 uF/25V	946-040221-009
C12	Capacitor, Tantalum, 1 uF/25V	946-040221-009
C13	Capacitor, Tantalum, 1 uF/25V	946-040221-009
R14	Resistor, Trim, Ceramic, 1K	925-042388-003
	Resistor, Trim, Ceramic, 1K	925-042388-003

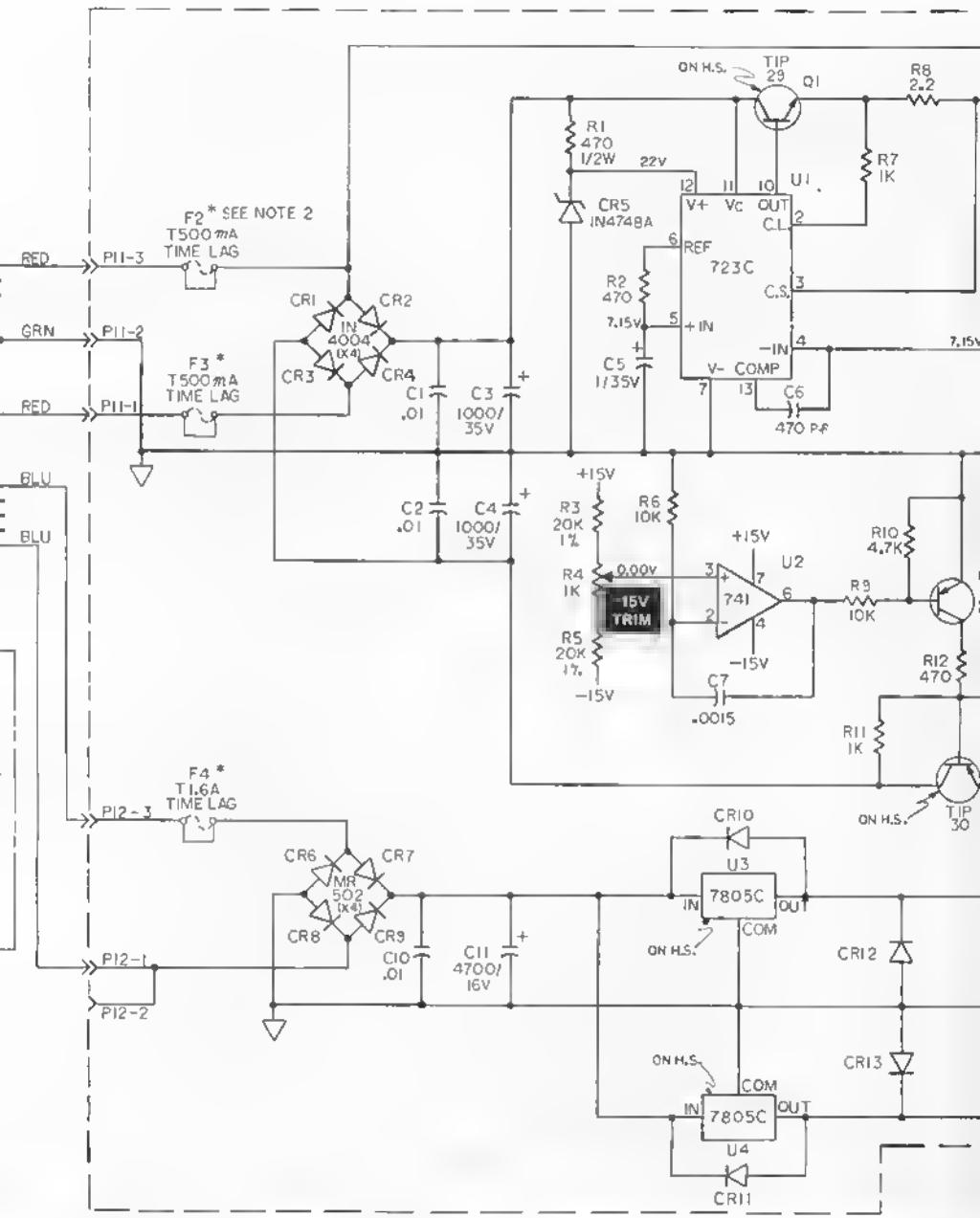


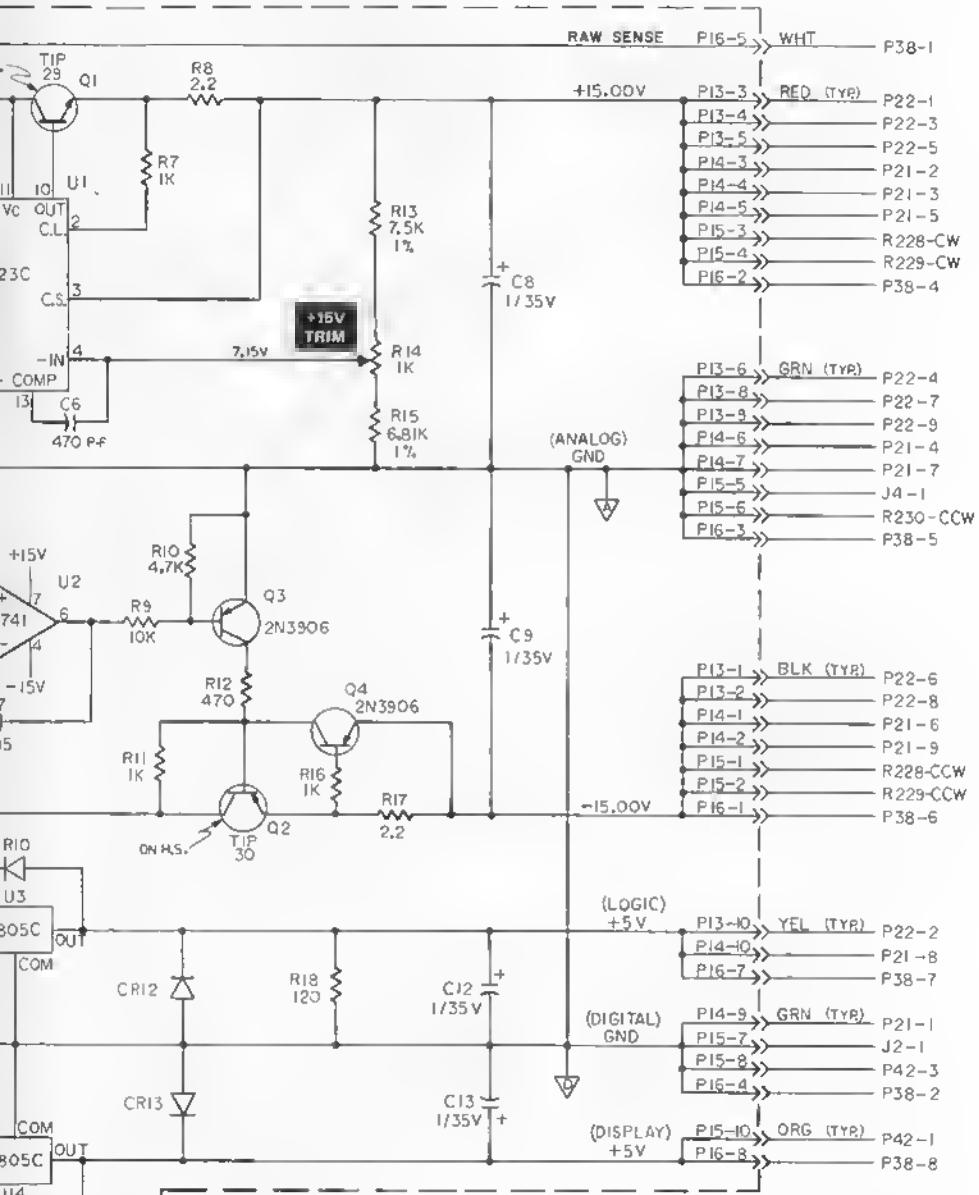
EXPORT MODEL 341BX

#### COMPONENT BASING TOP VIEW



EEC  
2N3906





## ALIGNMENT PROCEDURE

In normal service, The Source does not require tuning. However, when components are replaced, the alignment procedure outlined below should be followed in the sequence indicated in order to provide proper adjustment. Component designators refer to P.C. Board Schematics. Access to some trim adjustments require removal of the keyboard. Allow the instrument to warm up for approximately 30 minutes prior to starting alignment procedure.

## POWER SUPPLY ADJUSTMENTS

### POWER SUPPLY, BOARD 1

Set +15V supply by adjusting +15V trim R14 for +15.000V +/- 10mV. Set -15V supply by adjusting -15V trim R4 for -15.000V +/- 10mV. Check both +5V supplies for +5.0V +/- 0.2V.

### SYNTH, BOARD 2

Connect DVM to emitter of Q1. Set +10V supply for +10.000V +/- 10mV by adjusting J10V ADJ trim R12.

### D/A CONVERTER ADJUSTMENT, BOARD 3

Put OSC 1 LEVEL in edit and set to 0. Adjust D/A ZERO trim R60 for 0.000V +/- 2mV. (Connect DVM to U12 pin 1 on Synth Board 2.) Set OSC 1 LEVEL to 99. Adjust D/A FULL SCALE trim R62 for 10.000V +/- 2mV. Connect DVM to KB bus, Connector (P36-4), press high C and adjust KYBD trim R72 for 8.824V +/- 5mV.

## SYNTHESIZER CIRCUIT ALIGNMENT, BOARD 2

### OSC 1 SCALE ADJUST

Set control panel to the following:

GLIDE	0
MOD	OFF
OCT 1	32'
W/S 1	SAW
SYNC	OFF
OSC 1 LEVEL	99
NOISE	0
OSC 2 LEVEL	0
CUTOFF	0
EMPHASIS	0
COUOTUR AMT	99
Both SUSTAINS	99

All other contour functions	0
KB TRANSPOSE	0
Center Pitch Wheel	

Connect reference oscillator set to 65Hz, through series 4.7K resistor and 10uF capacitor, to connector P23-7. Depress low C and zero beat using RANGE trim R127.

Depress high C and zero beat using SCALE trim R123. Check low C and repeat above procedure if necessary.

### OSC 1 OCTAVE ADJUST

Set up the same as for Scale Adjust.

Depress low C and zero beat using rear panel FINE TUNE R228. Change OSC 1 FOOTAGE to 8' and zero beat using OCT trim R122. Repeat until both ends zero beat.

### OSC 1 HIGH END COMPENSATION

Set up the same as for Scale Adjust except set OCT 1 to 8' and KB TRANSPOSE to +1.

Depress low C and zero beat using rear panel FINE TUNE R228. Depress high C and zero beat with Osc 1 HIGH trim R100.

### OSC 1 TUNE CHECK

When high end compensation is set, check SCALE and OCTAVE adjustments. If they have changed, repeat steps above until all are correct.

### OSC 2 SCALE

Set control panel the same as for Osc 1 Scale. Adjust with the following exceptions:

OSC 2 LEVEL	99
OCT 2	32'
INTERVAL	1

The procedure is the same as for Osc 1 Scale Adjust except use OSC 1 as a reference pitch and adjust SCALE trim R72.

### OSC 2 OCTAVE ADJUST

Follow the same procedure used for Osc 1 except change OSC 2 FOOTAGE between 32' and 8' (OSC 1 FOOTAGE remains at 16') and adjust OCT trim R71.

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## OSC 2 HIGH END COMPENSATION

Follow the same procedure used for Osc 1 except adjust HIGH trim R39.

## OSC 2 TUNE CHECK

Refer to Osc 1 Tune Check procedure.

## OSC 2 RANGE ADJUST

Set the following controls:

OSC 1 OCTAVE	8'
OSC 2 OCTAVE	16'
INTERVAL	50

To access Osc 2 AUTO TUNE, press and hold STORE and press OSC 2 LEVEL. Set to 50 using incremental control knob. Adjust RANGE trim R78 for zero beats (unison).

## INTERVAL MONOTONICITY

Turn OSC 1 LEVEL to 0 and connect scope to U7A, pin 1 (2V/DIV DC). Turn up INTERVAL until a 10V transition occurs on scope. Move INTERVAL up and down through this transition and adjust INT trim R70 for a minimum pitch change.

## FILTER LADDER BALANCE

Set the following controls:

TRANSPOSE	0
OSC 1 LEVEL	0
OSC 2 LEVEL	0
CUTOFF	0
EMPHASIS	0
CONTOUR AMT	0
LOUDNESS SUSTAIN-ATTACK-DECAY-RELEASE	0
VOLUME	max

Strike low C repeatedly and with scope connected to audio output jack J4, adjust LADDER BAL trim R167 for pulse of <50mV.

## FILTER LEVEL BALANCE

Set the control panel the same as for Filter Ladder Balance except set EMPHASIS to 99 and LOUDNESS SUSTAIN to 99.

Hold down low C key. Measure voltage on pin 3 of U40A and adjust LEVEL BAL trim R168 to obtain the same reading on pin 1 of U40A.

## FILTER EMPHASIS ADJUST

Using the same control panel settings as above except EMPHASIS at 80, adjust EMPH trim R164 until filter just begins to oscillate (observe on scope).

## FILTER, SCALE AND RANGE ADJUST

Return control panel settings to LEVEL BALANCE setup and place KB TRACKING to FULL. Connect reference oscillator in the same manner used for Osc 1 Scale Adjust except set frequency at 80Hz. Depress low C and zero beat using SCALE trim R155. Depress high C and zero beat by adjusting RANGE trim R152. Repeat above steps until both ends are correct.

## CUTOFF MONOTONICITY

Using the same control panel setup as in the previous step except CUTOFF at 50, connect scope to U8A, pin 1 (2V/DIV DC). Turn up CUTOFF control while watching for a 10V transition on scope. Turn CUTOFF control up and down just enough to cause this transition to occur and adjust CUTOFF trim R146 for minimum pitch change.

## FILTER CONTOUR ATTACK & DECAY TIME

Set the following controls:

ATTACK	99
DECAY	0
SUSTAIN	0
RELEASE	0

Connect scope to pin 7 of U438 (2V/DIV DC). Depress any key and adjust RANGE trim R201 for attack time of 8 seconds.

## FILTER CONTOUR BALANCE

Set the following controls:

CONTOUR AMT	99
ATTACK	0

Short pin 9 of U26 to ground. Adjust CONTOUR BAL trim R205 so that the voltage on pin 6 of U45 is 0.000V +/- 10mV with respect to ground.

## LOUDNESS CONTOUR ATTACK & DECAY TIME

Set up the same as for Filter Contour except connect scope to pin 1 of U43A and adjust RANGE trim R179.

## MODULATION OSC RATE

Connect DVM to pin 7 of U13B and scope to pin 7 of U4BB. Turn MOD RATE control to obtain 5.2V reading. Adjust RANGE trim R223 for 7Hz (142.6 msec) +/- 0.5Hz.

## GLIDE TIME

Set GLIDE to 99. Adjust RANGE trim R19 to yield glide time from low C to high C and vice versa between 3 to 5 seconds.

## CHIP TEMPERATURE ADJUSTMENT, BOARD 2

### NOTE

Oscillator chip temperature is factory set and should not need further adjustment. Do not adjust unless the oscillator IC or components in the temperature compensation circuit are changed or proper tuning can not be accomplished.

## OSC 1 CHIP TEMPERATURE ADJUSTMENT

Turn TEMP trim R131 fully counterclockwise (wiper at -0.6V) and leave in this position for about 10 minutes to allow chip to cool to room temperature.

- Measure emitter voltage of Q15 (pin 3 of U34) with respect to ground (use 1K in series with probe) and record reading ( $V_C$ ).
- Estimate room temperature in degrees C ( $T_R$ ).
- Subtract room temperature from 55°C to determine temperature rise needed to reach 55°C.
- Multiply result by 2mV. (Transistor VBE decreases by 2mV/°C.)
- Add this product to cold reading ( $V_C$ ) measured above to determine hot reading ( $V_H$ ).

Example:  $T_R = 22^\circ\text{C}$  (72°F);  $V_C = -616\text{mV}$ ;

$$V_H = V_C + 2(55 - T_R)$$

$$-616 + (2 \times 33) = -550\text{mV} = V_H$$

- Adjust TEMP trim R131 to obtain reading determined above at emitter of Q15 (U34). Chip temperature now set at 55°C.

## OSC 2 CHIP TEMPERATURE ADJUSTMENT

Set up the control panel the same as for Osc 1 and follow the same procedure except TEMP trim R83 is adjusted to set voltage at emitter Q8 (pin 3 of U26).

## INCREMENTAL CONTROL CHECK, BOARD 3

## DUTY CYCLE

Attach a dual trace scope at U19 pin 6 ( $\phi 1$ ) and U19 pin 4 ( $\phi 2$ ). Rotate incremental control and note pulse duty cycle should be nominal 50% +/- 25%. Check clockwise and counterclockwise rotation.

## PHASE RELATIONSHIPS

Using same setup as above, check phase of the positive edge of  $\phi 1$  in comparison to  $\phi 2$  at approximately 250 RPM (1kHz output frequency). Positive edge of  $\phi 1$  should be at 50% +/- 10% of  $\phi 2$  pulse width. Since adjustment of phase requires a change in gap between VO1 and VO2 OPTO interruptors, malfunctioning unit should be replaced with a factory adjusted assembly.

## REPLACEMENT PARTS LIST

### STANDARDIZED COMPONENTS

REF. DESIGN.	DESCRIPTION	PART NO. SIR/III
R1X	Resistor, 1/4W, 5%, Carbon Film [Resistance (X) X (X) Multiples]	802 312RXX 001
R1R	Resistor, 1/4W, 1%, Metal Film [Resistance (X) R (X) Multiples]	803 42ZXX 031

### MISC1 LAYERED PRINTED CIRCUIT BOARDS, BOARD 4 BOARD 5 AND BOARD 6

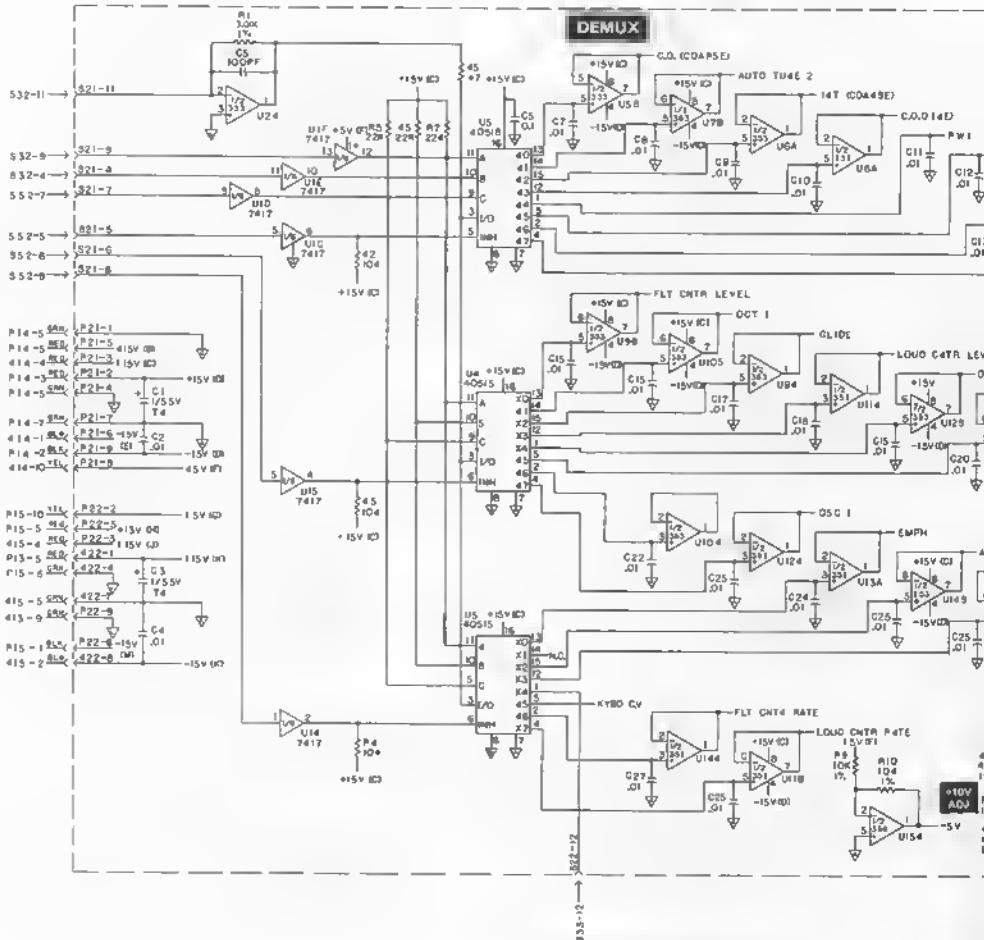
ART. NO. 0196	DESCRIPTION	INSTR. NO.
742	Header, CIS Right Angle, 100 Pins	810 042382 005
LED 1,2,3	LED, Red	838 041860 004
U1	IC, Decoder/Driver, 7441	991 041081 001
U2	Display, 1-1/2 Digit, 7404, 8630	809 042633 001
U3	IC, Decoder/Driver, 7447	991 041091 001
U4	Display, 1 Digit, MAN, 3610A	809 045311 001
U5	IC, Decoder/Driver, 7447	991 041087 001
U6	Display, 1 Digit, MAN, 3610A	809 045310 001
C1, C2	Capacitor, Tantalum, 0.01uF	94 045011 103
R26	Resistor, Polymer, 5K, 10% Log, VOLUME	925 045223 001
S91	Switch, Blue, 1	960 040223 018
S92	Switch, Blue, 0	960 040223 011
VO1, VO2	Opto-Interruptor, MC1311 Transistor, NPN, 2N3804	938 045311 001
Q1, Q2		991 041081 002

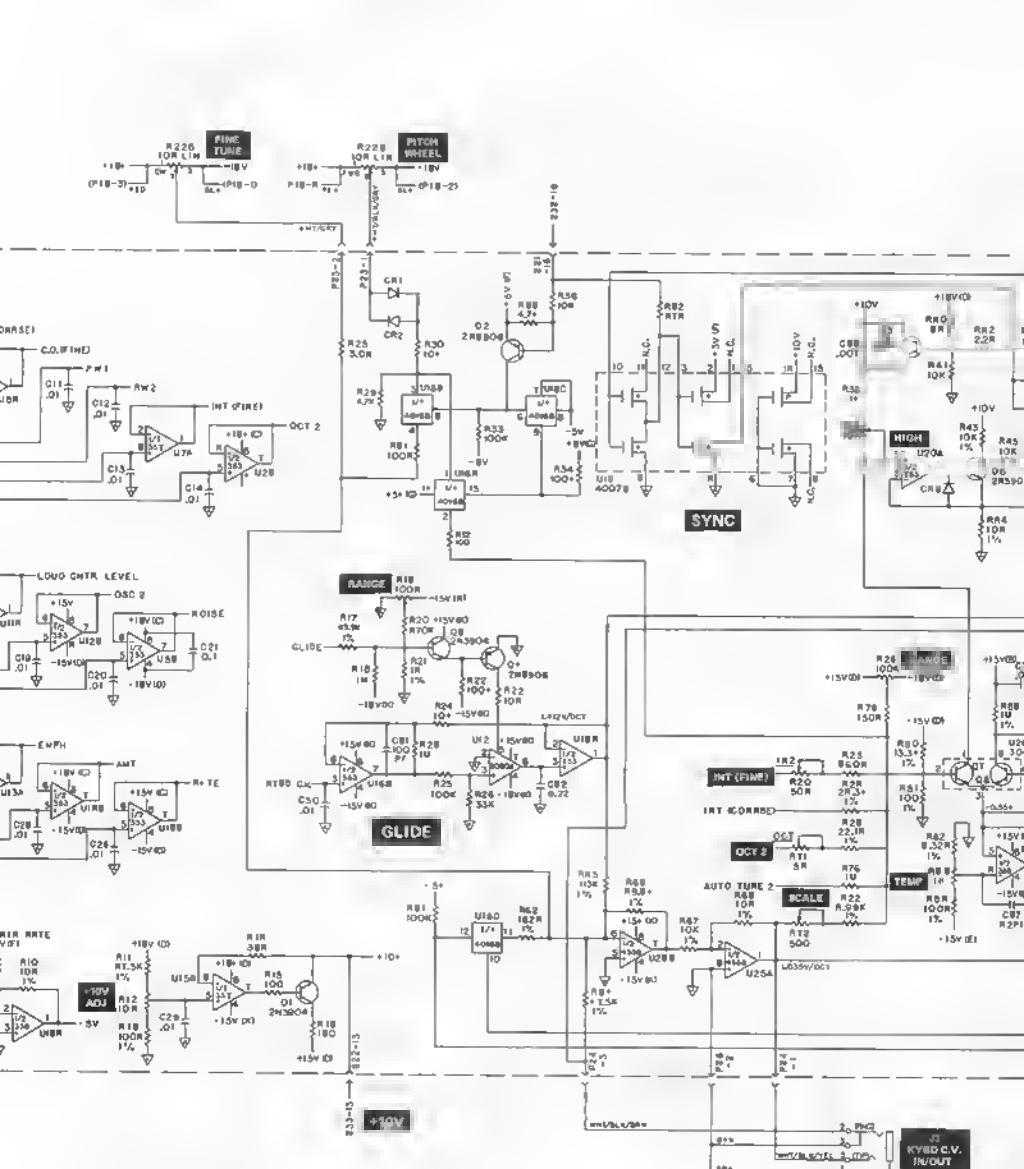
Part No.	Description	Line No.
BD 1	I.C. Board Assy., Power Supply	904-045291-001
*BD 1	I.C. Board Assy., Power Supply, Board	904-045281-002
BD 1	I.C. Board Assy., Power Supply, Board	904-045295-001
BD 3	I.C. Board Assy., Digital	904-045288-001
BD 4	I.C. Board Assy., Display	904-045273-001
BD 5	I.C. Board Assy., Octave	904-045175-001
BD 8	I.C. Board Assy., Opto-Intermezzzo	904-045172-001
	Incremental Controller Assy.	
F1	Fuse, Sto. Bllo, 1/2 Ampere, 3A.G.	904-045251-001
*F1	Fuse, 250mA, 5A, 20M	904-044084-001
*B1, *B3	Fuse, 600mA, 5A, 20M	904-044084-001
B4	Fuse, 1A, 6A, 20M	904-044084-001
J1	Connector, Bk, DIP	910-045372-001
J2	Jack, Phone, 3 Conductor, 250 Dua	910-041300-004
J3	Jack, Phone, NC Switch 1 Conductor, 250 Dua	910-041305-011
J4	Jack, Phone, 1 Conr., 250 Dua	910-041306-001
J128	Polarmeter, Analog, 10K Lm.	910-041806-001
R226	Polarmeter, Analog, 10K Lm., PITCH 99H11L	910-041806-001
R230	Potentiometer, Analog, 10K, Special Taper, 900-040111-001	
	W00 WH11L	
S1	Receptacle, CEE 77	925-040298-001
S12, S14	Connector, C/S, Sockt., 10 Pin, 1 Cr	904-042928-010
S10	Connector, C/S, Sockt., 1 Pin, 1 Cr	904-042928-010
S21, S22	Connector, C/S, Sockt., 1 Pin, 1 Cr	904-042928-010
S34, S41	Connector, C/S, Sockt., 1 Pin, 1 Cr	904-042928-010
S11, S31	Connector, C/S, Sockt., 1 Pin, 1 Cr	904-042928-010
S18, S28	Connector, C/S, Sockt., 1 Pin, 1 Cr	904-042928-010
S30, S36	Connector, C/S, Sockt., 1 Pin, 1 Cr	904-042928-010
S23	Convector, Sockt., 3 Pin, 100V Cr	904-042928-002
S11, S12	Convector, Sockt., 3 Pin, 100V Cr	904-042928-002
SW1	Switch, Dpst, DPST, 250V, BA	904-042800-001
I1	Transformer, 11W/220V	904-045288-001
	Acceptance, Bias, Damping	
	Acceptance, Bias, Export	
	Heat Sink, Coupler, Power Supply	
	Screw, No. 4 x 0.5, 1/4 lg, 1 apitile	003-047518-001
	Insulator, Alca, 1/8" x 1"	904-047730-001
	Washer, Insul., Shoulder	904-047229-001
	Sellit, 1/8" x 1"	904-047593-001
	Blade Clip, B.C. Mid, Green	904-047593-001
	1 Pin SMT IC Sockt.	904-042928-001
	10 Pin SMT IC Sockt.	904-042928-001
	14 Pin DIP IC Sockt.	904-045195-010
	10 Pin DIP IC Sockt.	904-045195-010
	18 Pin DIP IC Sockt.	904-045195-010
	24 Pin DIP IC Sockt.	904-045195-024
	40 Pin DIP IC Sockt.	904-045195-040
	Wheel Assembly	911-041191-001
	Set Screw, Allen	904-040486-002
	Detent, Spring	911-041179-001
	Detent, Tilt	904-041179-001
	Knob, Aww., Shorted	911-041231-001
	Knob, 1/8" Dia	911-041231-001
	Keyring	911-041231-001
	Power Cord, USA, 120V, 11AWG, 5-15P	904-042928-001
	Power Cord, European, 250V, 1-type B	904-042928-001
	Power Cord, Australian, 250V, 1-type C	904-042928-001
	Power Cord, Swiss, 250V, type C	904-042928-001
	Power Cord, UK, 250V, 1-type D	904-042928-001
	Tools, Blubert, 7/32" Dia x 2"	910-045484-001
	Keyboard Assy., 31 Keys, Cr. in C	910-045115-001
	Machine Screw, #10 x 1.25mm	903-043110-001
	White Key C	904-044471-001
	White Key D	904-044471-001
	White Key E	904-044471-001
	White Key F	904-044471-001
	White Key G	904-044471-001
	White Key H	904-044471-001
	White Key I	904-044471-001
	White Key J	904-044471-001
	White Key K	904-044471-001
	White Key L	904-044471-001
	White Key M	904-044471-001
	Black Key	904-044472-001
	Saving No. 1	904-044472-001
	Switch Unit No. 0	904-044472-001
	Switch Unit No. 1	904-044472-001
	Demper 98	914-044475-002
	Cabinet Assy., Without Overhang	901-045295-001
	Overlay, Overlay	904-045295-001
	Overlay, Left Hand Controller	913-045295-001
	Locating, Dimension, 120V	13-045120-002
	Label, Housing, E part, 220V	13-045120-004
	Base Plate	903-045253-001
	Owner's Manual	903-045253-001
	Owner's Information Pack	903-045253-001
	Shaping Canon	903-045251-002
	Filter, Side, I Open	903-045345-001
	Insert, Boom	903-045346-001
	ILC Board Clio, Nylon	973-045326-001
	Membrane Switch Blister	950-045243-001

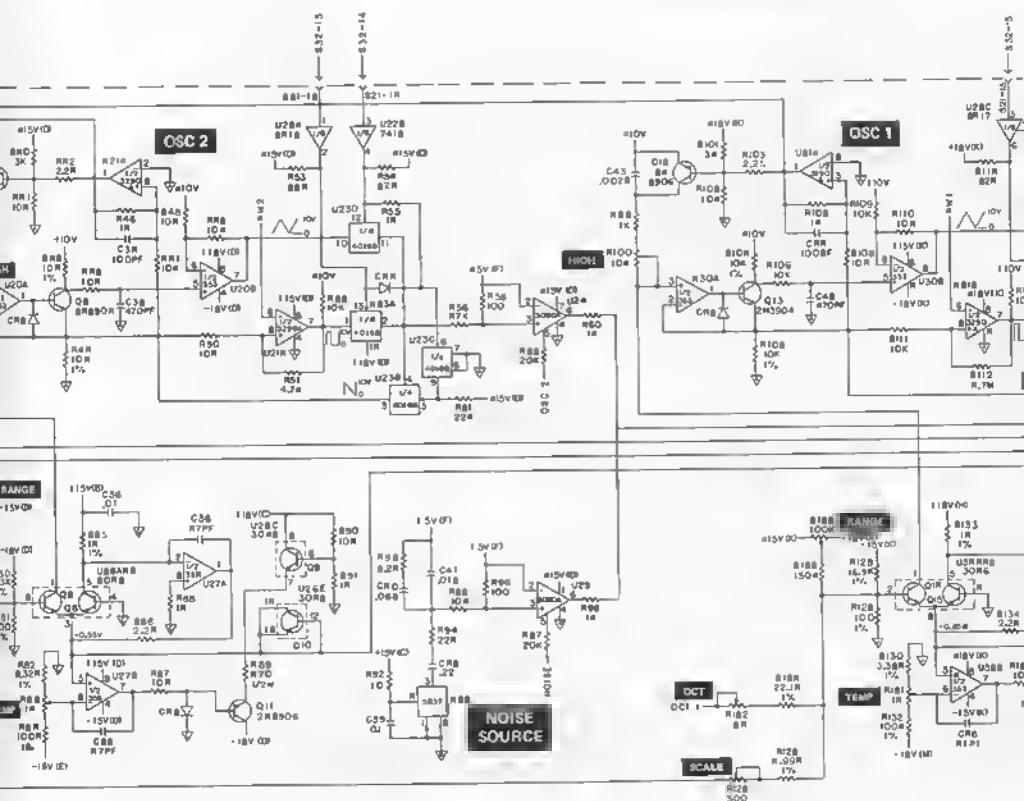
\*Bitmap Model Only

Part No.	Description	Ref. No.
P21	10 Pin, C8 Header, 1 Ctrs	910-041090-000
P22	9 Pin, C8 Header, 1 Ctrs	910-041090-000
P23	10 Pin, C8 Header, 1 Ctrs	910-042995-001
P24	1 Pin, C8 Header, 1 Ctrs	910-042995-001
U1	IC, 1411 Ver. Buffer	911-045305-001
U3	IC, 2632 Dual Operational Amplifier	911-041908-001
U4	IC, 4051B CMOS B-CMOS Multiplier	911-041050-001
U5	IC, 4051B CMOS B-CMOS Multiplier	911-041050-001
U6	IC, 353 Dual Operational Amplifier	911-041908-001
U7	IC, 353 Dual Operational Amplifier	911-041908-001
U9	IC, 353 Dual Operational Amplifier	911-041908-001
U10	IC, 353 Dual Operational Amplifier	911-041908-001
U11	IC, 362 Dual Operational Amplifier	911-041908-001
U12	IC, 362 Dual Operational Amplifier	911-041908-001
U13	IC, 363 Dual Operational Amplifier	911-041908-001
U14	IC, 363 Dual Operational Amplifier	911-041908-001
U18	IC, 368 Dual Input Invertor	911-041084-001
U19	IC, 353 Dual Input Invertor, Amplifier	911-041908-001
U20	IC, 3008A OTA	911-041064-001
U21	IC, 40116A CMOS Quad Switch	911-041064-001
U20	IC, 40078A CMOS Dual Complementary Logic	911-041908-001
U21	IC, 353 Dual Operational Amplifier	911-041908-001
U22	IC, 31411A 10x Buffer	911-041035-001
U23	IC, 40108A CMOS Quad Switch	911-041064-001
U24	IC, 3008A DIA	911-041064-001
U25	IC, 361 Dual Operational Amplifier	911-041145-001
U26	IC, 3048 10x Aver.	911-041108-001
U27	IC, 358 Dual Operational Amplifier	911-041084-001
U28	IC, 3811 Noise Generator	911-041015-001
U29	IC, 3008A DIA	911-041064-001
U30	IC, 351 Dual Operational Amplifier	911-041084-001
U31	IC, 3290A DIA Computer	911-041064-001
U32	IC, 40110A CMOS Quad Switch	911-041064-001
U33	IC, 3008A DIA	911-041064-001
U34	IC, 3048 10x Aver.	911-041108-001
U35	IC, 358 Dual Operational Amplifier	911-041084-001
U36	IC, 40119A CMOS Quad Switch	911-041064-001
U37	IC, 3048 10x Aver.	911-041108-001
U38	IC, 3008A DIA	911-041064-001
U39	IC, 351 Dual Operational Amplifier	911-041084-001
U40	IC, 4558 Dual Operational Amplifier	911-041110-001
U41	IC, 360 Dual Voltage Comparators	911-041058-001
U42	IC, 3008A DIA	911-041064-001
U43	IC, 353 Dual Operational Amplifier	911-041084-001
U44	IC, 3008A DIA	911-041064-001
U45	IC, 3008A DIA	911-041064-001
U46	IC, 40119A CMOS Quad Switch	911-041064-001
U47	IC, 40078A CMOS Dual Complementary Logic	911-041908-001
U48	IC, 353 Dual Operational Amplifier	911-041908-001
Q1	Transistor, PNP, 2N3908	911-041051-001
Q1	Transistor, PNP, 2N3908	911-041051-001
Q3	Transistor, PNP, 2N3904	911-041051-001
Q4	Transistor, PNP, 2N3905	911-041052-001
Q5	Transistor, PNP, 2N3905	911-041052-001
Q8	Transistor, PNP, 2N3908	911-041051-001
Q11	Transistor, PNP, 2N3908	911-041051-001
Q11	Transistor, PNP, 2N3908	911-041051-001
Q12	Transistor, PNP, 2N3904	911-041051-001
Q18	Transistor, PNP, 2N3902	911-041061-001
Q28	Transistor, PNP, 2N3902	911-041061-001
Q29	Transistor, PNP, 2N3902	911-041061-001
Q33	Transistor, PNP, 2N3904	911-041061-001
Q34	Transistor, PNP, 2N3904	911-041061-001
Q35	Transistor, PNP, 2N3904	911-041061-001
Q36	Transistor, PNP, 2N3906	911-041062-001
Q37	Transistor, PNP, 2N3906	911-041062-001
Q38	Transistor, PNP, 2N3908	911-041051-001
C1	Diode, Silicon, 1N4148	911-041018-001
C11	Diode, Silicon, 1N4148	911-041018-001
C13	Diode, Silicon, 1N4148	911-041018-001
CR4	Diode, Silicon, 1N4148	911-041075-001

REF DESIG	DESCRIPTION	PART NO	REF DESIG	DESCRIPTION	PART NO
C09	Diode, Signal, 1N4148	919-041075-001	P31	6 Position Flat Cable Connector	910-041511-006
C09	Diode, Signal, 1N4148	919-041075-001	P32	6 Position Flat Cable Connector	910-041511-008
C10	Diode, Signal, 1N4148	919-041075-001	P33	5 Position Flat Cable Connector	910-042095-005
C10	Diode, Signal, 1N4148	919-041075-001	P34	5 Pin CIS Header, .1 Ctrs	910-042096-001
C1	Capacitor, Tantalum, 1 uF/35V	946-040231-008	P35	4 Pin CIS Header, .1 Ctrs	910-042096-004
C2	Capacitor, Tantalum, .01 uF	947-045011-103	P36	4 Pin CIS Header, .1 Ctrs	910-042096-004
C3	Capacitor, Tantalum, .01 uF/35V	946-040231-009	P37	7 Pin CIS Header, 1 Ctrs	910-042097-007
C4	Capacitor, Tantalum, .01 uF	947-045011-103	P38	8 Pin CIS Right Angle Header, 1 Ctrs, Keypad	910-042098-006
C5	Capacitor, Tantalum, 100 pF	947-045005-101	III1	Battery, Lithium, 3V	925-045312-001
C6	Capacitor, Monolithic, 0.1 uF	946-041878-103	V1	Crystal, Quartz, 44MHz	921-041531-013
C7	Capacitor, Polyester, 0.1 uF	946-041878-103	K1	Relay, Reed, 500 Ohm Card	921-041511-011
C8	Capacitor, Polyester, 0.1 uF	946-041878-103	U1	IC, 74LS32, Hex D, Flip-Flop	991-041504-001
C9	Capacitor, Polyester, 0.1 uF	946-041878-103	U2	IC, 74C04, Hex Inverter	991-041505-001
C10	Capacitor, Polyester, 0.1 uF	946-041878-103	U3	IC, 74LS378, Hex D, Flip-Flop	991-041505-001
C11	Capacitor, Polyester, 0.1 uF	946-041878-103	U4	IC, 74LS378, Hex D, Flip-Flop	991-041505-001
C12	Capacitor, Polyester, 0.1 uF	946-041878-103	U5	IC, 74LS378, Hex D, Flip-Flop	991-041505-001
C13	Capacitor, Polyester, 0.1 uF	946-041878-103	U6	IC, 74LS378, Hex D, Flip-Flop	991-041505-001
C14	Capacitor, Polyester, 0.1 uF	946-041878-103	U7	IC, 74LS20, Quad AND	991-043577-001
C15	Capacitor, Polyester, 0.1 uF	946-041878-103	U8	IC, 45128, CMOS Hex Inverter	991-043621-001
C16	Capacitor, Polyester, 0.1 uF	946-041878-103	U9	IC, 45228, CMOS Hex Inverter	991-043621-001
C17	Capacitor, Polyester, 0.1 uF	946-041878-103	U10	IC, 78L05A, -5V Regulator	991-043487-001
C18	Capacitor, Polyester, 0.1 uF	946-041878-103	U11	IC, 74LS278, Hex D, Flip-Flop	991-043559-001
C19	Capacitor, Polyester, 0.1 uF	946-041878-103	U12	IC, 74LS278, Hex D, Flip-Flop	991-043559-001
C20	Capacitor, Polyester, 0.1 uF	946-041878-103	U13	IC, 74LS156, Dual Diode	991-043501-001
C21	Capacitor, Monolithic, 0.1 uF	947-04183-104	U14	IC, 74LS302, Dual 8-Bit Counter	991-043650-001
C22	Capacitor, Polyester, 0.1 uF	946-041878-103	U15	IC, 74LS24, Dual D, Flip-Flop	991-045299-001
C23	Capacitor, Polyester, 0.1 uF	946-041878-103	U16	IC, 74LS504, Hex Inverter	991-043593-001
C24	Capacitor, Polyester, 0.1 uF	946-041878-103	U17	IC, 74LS00, Quad NOR	991-043677-001
C25	Capacitor, Polyester, 0.1 uF	946-041878-103	U18	IC, 74LS129, Quad Tri Buffer	991-043501-001
C26	Capacitor, Polyester, 0.1 uF	946-041878-103	U19	IC, 40168, CMOS Hex Schmitt	991-043520-001
C27	Capacitor, Polyester, 0.1 uF	946-041878-103	U20	IC, 40138, CMOS Dual D, Flip-Flop	991-041110-001
C28	Capacitor, Polyester, 0.1 uF	946-041878-103	U21	IC, 74LS386, Dual OR	991-046303-001
C29	Capacitor, Polyester, 0.1 uF	946-041878-103	U22	IC, 74LS54, Dual D, Flip-Flop	991-045709-001
C30	Capacitor, Polyester, 0.1 uF	946-041878-103	U23	2532 PROM	991-046307-001
C31	Capacitor, Tantalum, 100 pF	947-045006-101	U24	IC, 280 CPU	991-043639-001
C32	Capacitor, Polyester, .22 uF	946-041878-224	U25	IC, 74LS02, Quad NOR	991-043552-001
C33	Capacitor, Polyester, .001 uF	946-041878-103	U26	IC, 74LS38, Diode	991-043645-001
C34	Capacitor, Tantalum, 100 pF	947-045006-101	U27	IC, 8514 RAM	991-045308-001
C35	Capacitor, Tantalum, 470 pF	947-045006-411	U28	IC, 8514 RAM	991-0446-001
C36	Capacitor, Tantalum, .01 uF	947-045006-412	U29	IC, AM8012PC, D/A Converter	991-045528-001
C37	Capacitor, Tantalum, 47 pF	947-045006-415	U30	IC, 9408, Dual Operational Amplifier	991-041111-001
C38	Capacitor, Tantalum, 47 pF	947-045006-416	U31	IC, 27904, Dual Comparator	991-041111-001
C39	Capacitor, Polyester, .01 uF	946-041878-493	U32	IC, 74LS22, Quad SR	991-043629-001
C40	Capacitor, Polyester, .008 uF	946-041878-493	U33	IC, 74LS22, Quad SR	991-043629-001
C41	Capacitor, Polyester, .018 uF	946-041878-153	U34	IC, 74LS04, Quad NOR	991-041052-001
C42	Capacitor, Polyester, .22 uF	946-041878-224	U35	IC, 74LS04, Quad NOR	991-041052-001
C43	Capacitor, Polyester, .0222 uF	946-041878-225	U36	IC, 74LS04, Quad NOR	991-041052-001
C44	Capacitor, Poly-Ins, 100 pF	941-045008-101	U37	IC, 74LS04, Quad NOR	991-041052-001
C45	Capacitor, Tantalum, 470 pF	941-045008-411	U38	IC, 74LS04, Quad NOR	991-041052-001
C46	Capacitor, Tantalum, 47 pF	947-048008-410	U39	IC, 74LS04, Quad NOR	991-041052-001
C47	Capacitor, Tantalum, 47 pF	947-048008-410	U40	IC, 74LS04, Quad NOR	991-041052-001
C48	Capacitor, Polyester, 47 uF	946-041878-474	U41	IC, 74LS04, Quad NOR	991-041052-001
C49	Capacitor, Aluminum Electrolytic, 220 uF/35V	945-044665-005	U42	IC, 74LS04, Quad NOR	991-041052-001
C50	Capacitor, Polyester, .01 uF	946-041878-103	U43	IC, 74LS04, Quad NOR	991-041052-001
C51	Capacitor, Polyester, .01 uF	946-041878-103	U44	IC, 74LS04, Quad NOR	991-041052-001
C52	Capacitor, Polyester, .01 uF	946-041878-103	U45	IC, 74LS04, Quad NOR	991-041052-001
C53	Capacitor, Polyester, .01 uF	946-041878-103	U46	IC, 74LS04, Quad NOR	991-041052-001
C54	Capacitor, Tantalum, 470 pF	941-045008-471	U47	IC, 74LS04, Quad NOR	991-041052-001
C55	Capacitor, Aluminum Electrolytic, 10 uF/18V	945-044665-007	U48	IC, 74LS04, Quad NOR	991-041052-001
C56	Capacitor, Polyester, 047 uF	946-041878-473	U49	IC, 74LS04, Quad NOR	991-041052-001
C57	Capacitor, Polyester, .047 uF	946-041878-473	U50	IC, 74LS04, Quad NOR	991-041052-001
C58	Capacitor, Polyester, 33 uF	946-041878-334	U51	IC, 74LS04, Quad NOR	991-041052-001
C59	Capacitor, Monolithic, 0.1 uF	947-045183-104	U52	IC, 74LS04, Quad NOR	991-041052-001
R12, R30	Resistor, Trim Pot, Carbon, 10k	925-040275-004	U53	IC, 74LS04, Quad NOR	991-041052-001
R13	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U54	IC, 74LS04, Quad NOR	991-041052-001
R17	Resistor, Trim Pot, Carbon, 1k	925-040275-003	U55	IC, 74LS04, Quad NOR	991-041052-001
R21	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U56	IC, 74LS04, Quad NOR	991-041052-001
R22	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U57	IC, 74LS04, Quad NOR	991-041052-001
R23	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U58	IC, 74LS04, Quad NOR	991-041052-001
R24	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U59	IC, 74LS04, Quad NOR	991-041052-001
R25	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U60	IC, 74LS04, Quad NOR	991-041052-001
R26	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U61	IC, 74LS04, Quad NOR	991-041052-001
R27	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U62	IC, 74LS04, Quad NOR	991-041052-001
R28	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U63	IC, 74LS04, Quad NOR	991-041052-001
R29	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U64	IC, 74LS04, Quad NOR	991-041052-001
R30	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U65	IC, 74LS04, Quad NOR	991-041052-001
R31	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U66	IC, 74LS04, Quad NOR	991-041052-001
R44	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U67	IC, 74LS04, Quad NOR	991-041052-001
R52	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U68	IC, 74LS04, Quad NOR	991-041052-001
R53	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U69	IC, 74LS04, Quad NOR	991-041052-001
R54	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U70	IC, 74LS04, Quad NOR	991-041052-001
R55	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U71	IC, 74LS04, Quad NOR	991-041052-001
R56	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U72	IC, 74LS04, Quad NOR	991-041052-001
R57	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U73	IC, 74LS04, Quad NOR	991-041052-001
R58	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U74	IC, 74LS04, Quad NOR	991-041052-001
R59	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U75	IC, 74LS04, Quad NOR	991-041052-001
R60	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U76	IC, 74LS04, Quad NOR	991-041052-001
R61	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U77	IC, 74LS04, Quad NOR	991-041052-001
R62	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U78	IC, 74LS04, Quad NOR	991-041052-001
R63	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U79	IC, 74LS04, Quad NOR	991-041052-001
R64	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U80	IC, 74LS04, Quad NOR	991-041052-001
R65	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U81	IC, 74LS04, Quad NOR	991-041052-001
R66	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U82	IC, 74LS04, Quad NOR	991-041052-001
R67	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U83	IC, 74LS04, Quad NOR	991-041052-001
R68	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U84	IC, 74LS04, Quad NOR	991-041052-001
R69	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U85	IC, 74LS04, Quad NOR	991-041052-001
R70	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U86	IC, 74LS04, Quad NOR	991-041052-001
R71	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U87	IC, 74LS04, Quad NOR	991-041052-001
R72	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U88	IC, 74LS04, Quad NOR	991-041052-001
R73	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U89	IC, 74LS04, Quad NOR	991-041052-001
R74	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U90	IC, 74LS04, Quad NOR	991-041052-001
R75	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U91	IC, 74LS04, Quad NOR	991-041052-001
R76	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U92	IC, 74LS04, Quad NOR	991-041052-001
R77	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U93	IC, 74LS04, Quad NOR	991-041052-001
R78	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U94	IC, 74LS04, Quad NOR	991-041052-001
R79	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U95	IC, 74LS04, Quad NOR	991-041052-001
R80	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U96	IC, 74LS04, Quad NOR	991-041052-001
R81	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U97	IC, 74LS04, Quad NOR	991-041052-001
R82	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U98	IC, 74LS04, Quad NOR	991-041052-001
R83	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U99	IC, 74LS04, Quad NOR	991-041052-001
R84	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U100	IC, 74LS04, Quad NOR	991-041052-001
R85	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U101	IC, 74LS04, Quad NOR	991-041052-001
R86	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U102	IC, 74LS04, Quad NOR	991-041052-001
R87	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U103	IC, 74LS04, Quad NOR	991-041052-001
R88	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U104	IC, 74LS04, Quad NOR	991-041052-001
R89	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U105	IC, 74LS04, Quad NOR	991-041052-001
R90	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U106	IC, 74LS04, Quad NOR	991-041052-001
R91	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U107	IC, 74LS04, Quad NOR	991-041052-001
R92	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U108	IC, 74LS04, Quad NOR	991-041052-001
R93	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U109	IC, 74LS04, Quad NOR	991-041052-001
R94	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U110	IC, 74LS04, Quad NOR	991-041052-001
R95	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U111	IC, 74LS04, Quad NOR	991-041052-001
R96	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U112	IC, 74LS04, Quad NOR	991-041052-001
R97	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U113	IC, 74LS04, Quad NOR	991-041052-001
R98	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U114	IC, 74LS04, Quad NOR	991-041052-001
R99	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U115	IC, 74LS04, Quad NOR	991-041052-001
R100	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U116	IC, 74LS04, Quad NOR	991-041052-001
R101	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U117	IC, 74LS04, Quad NOR	991-041052-001
R102	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U118	IC, 74LS04, Quad NOR	991-041052-001
R103	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U119	IC, 74LS04, Quad NOR	991-041052-001
R104	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U120	IC, 74LS04, Quad NOR	991-041052-001
R105	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U121	IC, 74LS04, Quad NOR	991-041052-001
R106	Resistor, Trim Pot, Carbon, 100k	925-040275-001	U122		







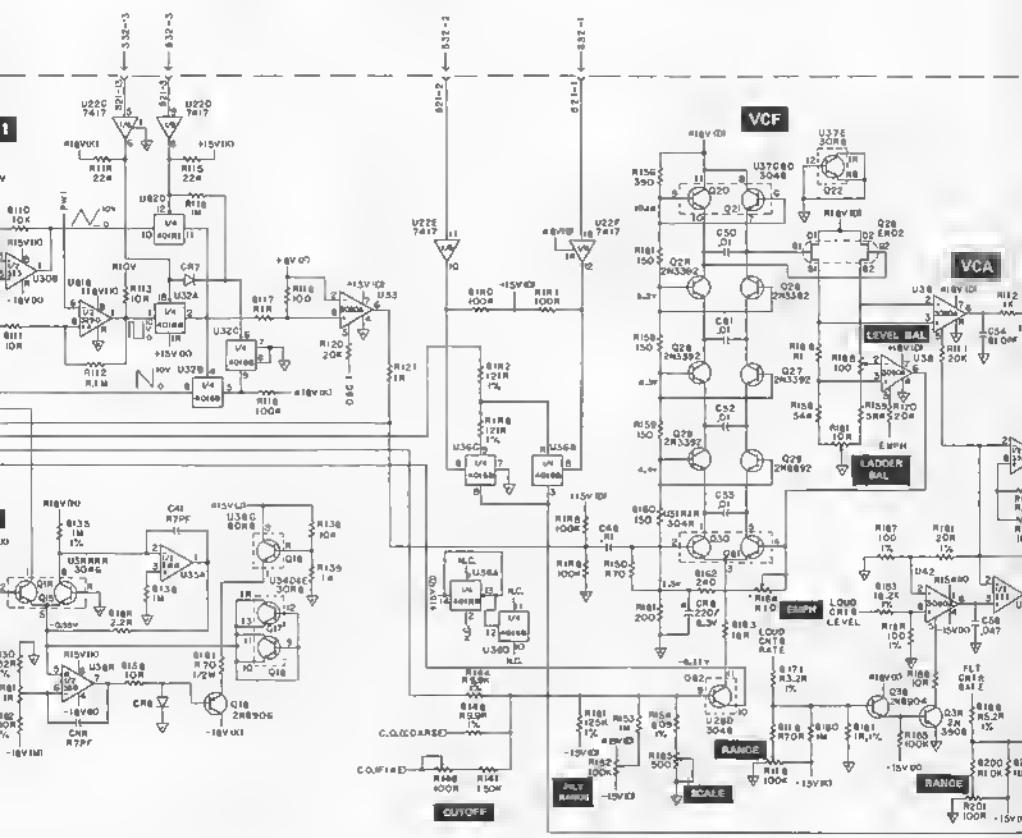
MOZET

UNLESS OTHERWISE SPECIFIED:  
ALL RESISTORS ARE IN OHMS  $\pm 5\%$   
ALL CAPACITORS ARE IN MICRO FARADS

## ALL CHILDREN HAVE TALENTS

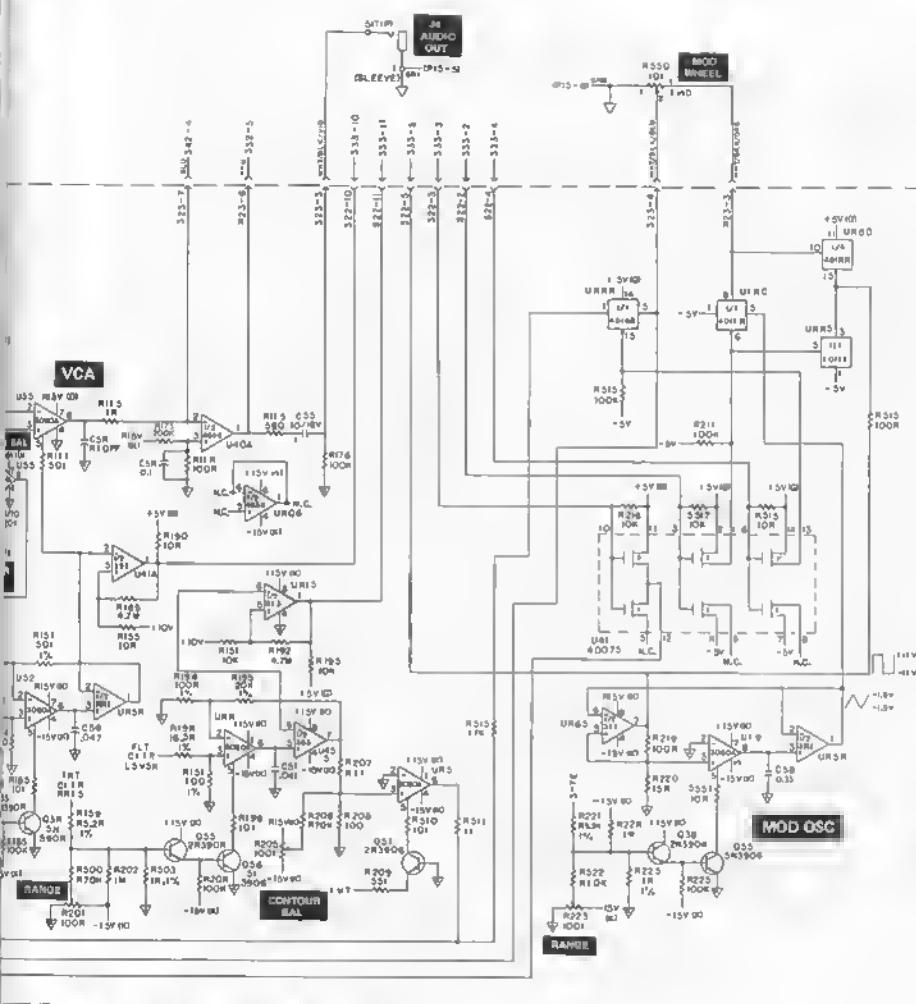
ALL  RAE DIAHOLIC GROW

13  
KYED C.V.  
IN/OUT



## COMPONENT BASING





#### CONTOUR GENERATOR

**oldschool-sound**  
www.oldschool-sound.com  
Free manuals for Free Vintage addicts ! Creative use only.

Part Number: 997-A45245-990  
February 9, 1983  
SOURCE ADDENDA - Software Revisions  
3.2 and above

SEQUENCER TRANSPOSE  
The sequencer may be transposed by the keyboard. The "zero" point - point of no transposition - is the first note of the sequence, transposed to the middle octave of the keyboard. For example:

- o A sequence is recorded starting on low F#.

o When this sequence is played back, F# in the middle octave is the zero point; playing this key will have no effect on the pitch of the sequence. Playing any other key will transpose the sequence.

Basing the transpose function in the middle octave allows any sequence to be transposed up or down, no matter where on the keyboard the original sequence was played. Note that this expands the instrument's range above and below the normal keyboard span.

Stopping the sequencer and restarting it with the CONTINUE function will retain the last transposition. Starting the sequencer with the PLAY function will cancel all transposition.

#### DRUM INTERFACE

YOUR SOURCE has several new rear panel connections not mentioned in the owner's manual. They are used to interface THE SOURCE with the various drum and rhythm units currently on the market.

The DIN connector (formerly used for cassette connections) is now used to connect to drum machines made by Roland and others who use these types of connectors. This connection allows the drum unit's CLOCK to also drive THE SOURCE's sequencers. The 12" DIN cable that connects THE SOURCE and the drum unit is available from the Moog Service Department. The TRIGGER IN jack connects to any output from a drum unit that puts out a trigger. ONLY on the downbeat. This trigger restarts the sequencer or steps the arpeggiator so the drumbeat and sequence will always be synchronized.

#### RECORDING A SEQUENCE FOR USE WITH A DRUM UNIT:

- o Start the drum unit. This ensures that both instruments will be synchronized.
- o Set THE SOURCE for sequencer record (as explained in the manual).
- o On the downbeat, play the desired sequence.

NOTE: Be sure to release the last note before this final downbeat. For best synchronization, hit STOP slightly after the downbeat.

#### PLAYING BACK A SEQUENCE IN SYNCHRONIZATION:

- o On THE SOURCE, hit LEVEL 2, then SEQUENCE PLAY, with the drum interface connections in place. THE SOURCE will not play.
- o At the desired time, start the playback of the drum unit. THE SOURCE will immediately begin playing the sequence in synchronization with the drum unit.

NOTE: The trigger pulse provided by the drum unit automatically restarts the sequence. Make sure to hit STOP at the right time when recording the sequence or else the final note may be "chopped off" due to playback when the sequence restarts.

#### CASSETTE INTERFACE

The cassette routine for storage and retrieval of digital program information has been improved to work with a greater variety of cassette recorders. The front panel controls function as explained in the owner's manual but the rear panel connections and display indicators have been updated.

The jack labeled **FROM TAPE** should be connected to the earphone or headphone output for best results, but a line level signal may also be used. The **REMOTE** jack should be used if the cassette recorder has a remote microphone on/off switching input. The **TO TAPE** jack should be connected to the aux or line input on the cassette recorder.

If you are using a stereo cassette recorder, be sure to only use one channel and make sure the inputs and outputs are connected to the same channel. The connectors used between THE SOURCE and a cassette recorder may be purchased locally from any electronics distributor.

When loading information from cassette, be sure the tape is wound back to the beginning of the "tone leader". If the tape is not wound enough, THE SOURCE may receive only a partial load. Note the tape counter settings carefully before starting any cassette operation.

#### SOUND CHARTS

The sound charts of the factory programs are approximate. Some controls, such as OSC 2 FREQUENCY and FILTER CUTOFF, have resolution higher than the incremental readout can display. Small differences from instrument to instrument may result in a setting that does not exactly match the manual. As long as the program sounds correct, it is not a problem.

#### ERRATA

Page 1      - Line 3 - phrase should read "harmful static charges".

Page 22     - In the second paragraph of #3, change "blank leader" to "tone leader" with the display indicating "20" instead of "CC". As data is being saved, the display will indicate a closed parenthesis "()" instead of "So".

              - In the two lines after the #1, change "blank leader" to "tone leader".

Page 44     - All "eighth-notes" should be "sixteenth-notes".

Page 49-50   - The trigger cable diagrams should be reversed; on the older version instruments, the TRIG IN/OUT jack output signal appears at the ring, and the input connection is at the tip. Note that after version 1ns split the shorting trigger (S-Trig) into both an S-TRIG INPUT and a -TRIG OUTPUT.

Page 49     - First sentence - delete "and filter".

MANUFACTURER and MODEL	IN/OUT CONFIGURATION	MODULE MODEL & S/N	IN/OUT CONFIGURATION	SPECIAL NOTES	06:17:03
ROLAND DR. RHYTHM	CLOCK ACCENT	OUT-1/8" MINIJACK..... SOURCE>3180 OUT-1/8" MINIJACK..... SOURCE>3180	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	Rewire Taurus cable 957-045453-001. Buy or fabricate locally.	
ROLAND CR-6000 COMPURHYTHM	CLOCK STEP	OUT-AVAILABLE INSIDE... SOURCE>3180 OUT-1/4" PHONE JACK.... SOURCE>3180	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	Rewire Taurus cable 957-045453-001. Buy or fabricate locally.	
ROLAND DRUMATIX TR-606	CLOCK/SYNC TRIGGER	OUT-5 PIN DIN JACK..... SOURCE>3180 OUT-(2)1/8" MINIJACKS... SOURCE>3180	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	Use Taurus cable 957-045453-001. Buy or fabricate locally.	
ROLAND TR-808	CLOCK/SYNC TRIGGER	OUT-5 PIN DIN JACK..... SOURCE>3180 OUT-1/4" PHONE JACK.... SOURCE>3180	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	Use standard guitar cable.	
KORG KPR-77	CLOCK/SYNC TRIGGER	OUT-5 PIN DIN JACK..... SOURCE>3180 OUT-1/4" PHONE JACK.... SOURCE>3285X	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	Requires DIN rewiring. Use standard guitar cable.	
E-MU SYSTEMS INC. DRUMULATOR	CLOCK TRIGGER	OUT-RCA PIN"PHONE" JACK.. SOURCE>3180 OUT-RCA PIN"PHONE" JACK.. SOURCE>3285X	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	No direct interface. Needs "pulsed" clock signal.	
LINN ELECTRONICS LINNDRUM	SYNC TRIGGER	OUT-1/4" PHONE JACK.... SOURCE>3180 OUT-1/4" PHONE JACK.... SOURCE>3285X	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	No direct interface. No direct interface. Needs "pulsed" clock signal.	
GARFIELD ELECTRONICS SYNC DR. CLICK	SYNC STEP(?)	OUT-5 PIN DIN JACK..... SOURCE>3180 OUT-1/4" PHONE JACK.... SOURCE>3285X	SYNC IN 5 PIN DIN JACK TRIGGER IN 1/4" PHONE JACK	Use Taurus cable 957-045453-001. Use standard guitar cable.	
OBERHEIM DMX	..... ..... .....	..... USE DR. CLICK .....	SOURCE>3180 SYNC IN 5 PIN DIN JACK SOURCE>3285X TRIGGER IN 1/4" PHONE JACK	No direct interface. Needs "pulsed" clock signal.	
??FUTURE???	.....	.....	.....	.....	
ANY MANUFACTURER'S SEQUENCERS	VARIOUS..... ..... .....	..... ..... .....	SOURCE>3285X TRIGGER IN 1/4" PHONE JACK	Needs "pulsed" clock signal. "Will not interface due to software generated trigger in Source."	
MOOG TAURUS II	C/V OUT	1/4" PHONE JACK..... SOURCE ALL	KB-CV IN/OUT 1/4" STEREO JACK "TIP" to "RING" cable 957-046077-901		
"CONTROLLER"	S-TRIGGER	1/4" PHONE JACK..... SOURCE ANY	S-TRIG IN 1/4" VARIOUS JACKS pitch output is additive and drifts slightly during "source only" usage. Add DPDT External synthesizer switch to Taurus. See Interface Note #1.		
MOOG TAURUS II "SYNTHESIZER"	KYBD IN/OUT 1/4" STEREO JACK..... SOURCE ALL TRIG IN/OUT 1/4" STEREO JACK..... SOURCE ANY	KB-CV IN/OUT 1/4" STEREO JACK "TIP" to "RING" cable w/IK pot. 1/4" VARIOUS JACKS use standard guitar cable. Connection requires pitch. See Interface Note #2.			
OTHER MANUFACTURER'S PITCH OUT SYNTHESIZERS	GATE OUT	VARIOUS JACKS..... SOURCE ANY	KB-CV IN/OUT 1/4" STEREO JACK "TIP" to "RING" w/IK pot. unusable jack. Add circuitry for GATE (V-TRIG). Rescale pitch. Interface Notes #2 and #3.		

## DIGITAL BOARD MODIFICATIONS

DELETE	ADD	PART NUMBER	COMMENTS
R2 470 OHM	R2 1K OHM	852-317102-001	Update schematic
C1 .1 uf	C1 .01 uf	947-045183-103	Update schematic
Jumper at the C2 location.	Step 1 - mount and solder C2, a 2.2 uf/25V capacitor with negative side towards P37-3.	945-040209-014	Update schematic by showing R89 from ground to the negative side of C2.
	Step 2 - Mount a 100K, R89 from right side of R2 to negative side of C2.	852-312104-001	
R3 22K	Deletion only	Not applicable	Update schematic.
R63 100 Ohm	R63 10K	852-312103-001	Update schematic
C15 .01uf	C15 .1uf	946-041978-104	Update schematic
R65 22K	R65 Add 100K from top of old R65 location to the bottom of CR16 location (CR16 location is not used).	852-312104-001	Update schematic by showing R65 from +5V to U30 Pin 5.
R68 47K Ohm	R68 100K Ohm	852-312104-001	Update schematic
R67 750K Ohm	R67 100K Ohm	852-312104-001	Update schematic
R66 47K Ohm	R66 100K Ohm	852-312104-001	Update schematic
R69 4.7M Ohm	R69 2M Ohm	852-312205-001	Update schematic
C16 220pf	C16 470pf	947-045008-471	Update schematic
Not applicable	Insulated white wire jumper from the top of R66 to bottom of the old R65 location.	987-040751-999	Update schematic by shorting R64 to pin 6 of U30.
Not applicable	CR20 and CR21- Add two 1N4748A diodes at P37 Pins 1 and 2.	919-041255-002	Solder two 22 volt 1 watt 5% zener diodes to the traces coming from Pins 1 and 2 of P37 and join cathodes together.
EPROM U23 Old version	EPROM U23 Version 3.2	991-045307-910	Return old EPROM version to Moog for recycling. Be sure to return it in black black velostat foam provided.
K1 .5 amp closure rating	K1 1 amp closure rating	921-045141-002	Replace old relay with one of larger current rating.

-----  
DIGITAL BOARD WIRING

**S71 (7 PIN Connector)**

Digital Board

Pin 1 (brown)	On trace running from U12 pin 14 to U11 pin 14.
Pin 2 (yellow)	Top side of C8 the .01uf
Pin 3 (white)	On pin 11 of U13
Pin 4 (blue)	On trace running from U12 pin 4 to U11 pin 4
Pin 6 (orange)	On trace running from U12 pin 6 to U11 pin 6
Pin 7 (green)	Bottom of C8 the .01uf

-----  
TRIGGER-IN JACK BOARD ASSEMBLY

**DESIGNATOR**

**PART NUMBER**

**DESCRIPTION**

Not applicable	980-046071-001	Printed circuit board
P71	910-040299-007	Header CIS 7 pin 0.1 ctrs.
Not applicable	906-045188-016	16 Pin IC socket
J2	910-045552-003	Jack 1/4" Phone (RN113B)
U1	991-043521-001	IC4502B CMOS Hex Buffer
C1, C2, C4	947-045183-103	Capacitor .01 MFD Ceramic
C3	947-045008-471	Capacitor 470 PFD Ceramic
R1, R3, R5	852-312104-001	Resistor 100K 1/4W +/-5%
R2, R4, R6	852-312474-001	Resistor 470K 1/4W +/-5%

-----  
JACK WIRING

**JACK**

**FROM**

DIN Pin 1	Blue wire from jack board
DIN Pin 2	Green wire from jack board
DIN Pin 3	Brown wire from jack board

-----  
NEW JACKS

S-trig out (hot)	White/yellow wire shorten to 9" from S37 Pin 6
S-trig in (hot)	White/violet wire shorten to 9" from S37 Pin 7
S-trig in (gnd)	Green wire from S15 Pin 7
S-trig out (gnd)	Bare wire 1.5" long to S-trig In (gnd)
To tape (hot)	Black wire shorten to 8" from S37 Pin 3
To tape (gnd)	Shield wire shorten to 8" from S37 Pin 4
From tape (hot)	White/blue wire shorten to 8" from S37 Pin 5
From tape (gnd)	Green wire 2" long to tape (gnd)
Remote (plastic thread) (hot)	White/black/red wire shorten to 8" from S37 Pin 1; add 4.7 ohm resistor, part number 852-512047-001 in series with this wire and cover with heat shrink tubing.
Remote (plastic thread) (gnd)	White/black/orange wire shorten to 8" from S37 Pin 7. Tie wrap where necessary

-----  
SYNTHESIZER BOARD MODIFICATIONS

**DELETE**

**ADD**

**PART NUMBER**

**COMMENTS**

R225 1K Ohm 1%	R225 909 Ohm 1%	853-429090-031	Adjust R223 to 250 Hz maximum and update schematic and test procedures accordingly
----------------	-----------------	----------------	--

R224 1MEG

Deletion only

"As required"

Delete this resistor only if unable to adjust R223 to the 250Hz requirement above.

SOURCE SOFTWARE AND ACCESSORIES  
 Moog Music Inc.  
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 Buffalo, NY 14225

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DESCRIPTION	PART NUMBER	\$ EACH	TOTAL
Cassette of factory programs	935-044665-001	\$10.00	
Cassette of programs by Jan Hammer featuring FEEDBACK, STEEL DRUM, SYNC and many bass programs.	935-044665-002	\$10.00	
Cassette of DEVO programs by Mark Mothersbaugh from his latest album cuta.	935-044665-003	\$10.00	
Cassette of programs by Gary Wright from his ENDANGERED SPECIES, LIGHT OF SMILES, DREAM WEAVER and WRIGHTS PLACE albums.	935-044665-004	\$10.00	
"DIN" CABLE, 12', double ended, for use with rhythm unit interfacing.	957-045453-001	\$15.00	
"DIN" CABLE, 6', terminated with two 1/4" phone plugs for use with rhythm unit interfacing for SYNC and START/STOP.	957-045453-002	\$15.00	
"CV INPUT" cable 10' 1/4" stereo to 1/4" mono (ring to ground connection). NOTE: "CV OUTPUT" can be accomplished with a standard mono guitar cable.	957-046077-901	\$10.00	
TAPE RECORDER cable and other general purpose uses. Molded 1/4" phone to RCA (phono) plug - 6' long.	957-043396-001	\$10.00	
GENERAL INTERFACING cable. 1/4" phone to 1/8" (3.5mm) miniature plug.	957-043396-002	\$10.00	
POWER CORD, detachable 120V U.S.A.	957-041794-001	\$ 8.00	
POWER CORD, detachable 220V EUROPE	957-043400-001	\$ 9.00	
PAINTER'S CAP - White cotton with plastic white bill and 1-1/2" black MOOG logo. Adjustable back strap - one size fits all.	935-044681-001	\$ 5.00	
SOURCE T-SHIRT - 50% cotton/polyester, full cut with set-in sleeves and ribbed neck. Light blue with a screened SOURCE superimposed on an expanding grid pattern with lettering "MAY THE SOURCE BE WITH YOU".	935-043322-961 935-043322-962 935-043322-963 935-044322-964	Small Medium Large X-Large	\$ 6.00 \$ 6.00 \$ 6.00 \$ 6.00

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N.Y. Residents add 7% Tax	
Shipping and handling	\$ 3.00
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